Mr. ALPERT’S HONORS CONCEPTUAL PHYSICS – PRACTICE SOUND TEST 2017

Formulas you may use:

***Speed of sound in air = 331.5 m/s + 0.6 m/s per degree Celsius***

***Velocity of a wave = frequency times wave length v = f ● ***

***Frequency heard for an object approaching you (Doppler effect) :***

***Frequency heard: frequency produced by the object times speed of sound plus the speed of the object divided by the speed of sound:***

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Why does sound travel faster in solids than in liquids?

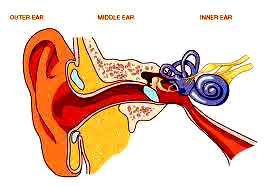
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1. That part of a sound wave where the particles are close together is called
   1. Concentration
   2. Vacuum
   3. Rarefaction
   4. Compression
2. Why is sound called a “pressure” wave?

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1. The number of sound vibrations per second is called \_\_\_\_\_\_\_.
   1. period
   2. frequency
   3. time period
   4. amplitude
2. Explain why a tuba produces a lower pitch than a flute.

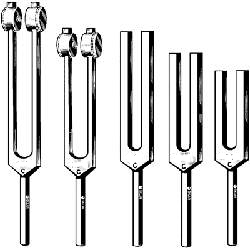
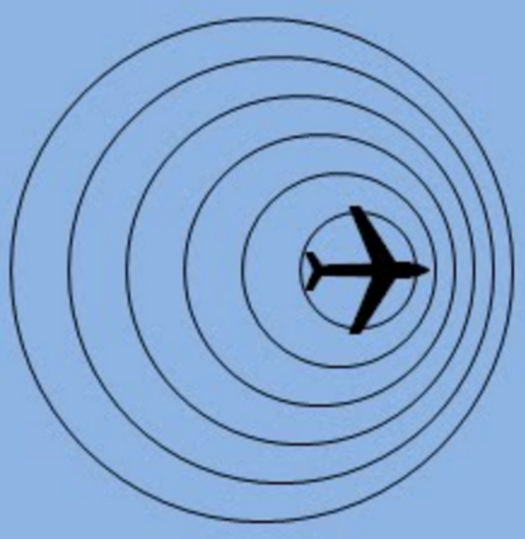
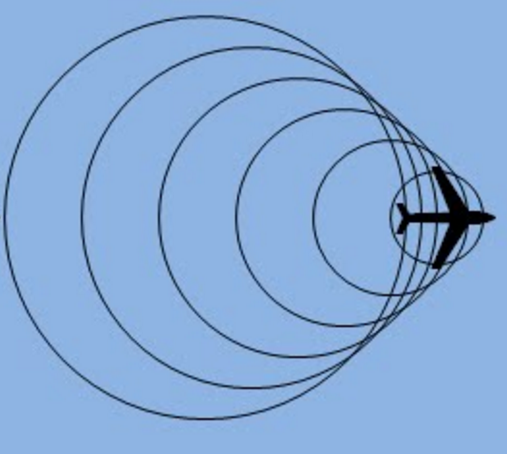
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1. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ frequency is the sound that an object produces when it is set in vibration by being struck, plucked, bowed or blown.
2. What is the period of a sound that has a frequency of 5 Hz? You must show units for full credit.  
   1. Identify the parts of the ear on the diagram below by drawing an arrow and writing a letter for each part
3. Pinna
4. Semicircular canals
5. Cochlea
6. Ear canal
7. Ear drum
8. Eustachian tube
9. Auditory nerve
10. Ossicles
11. The \_\_\_\_\_\_\_ keeps the pressure in the middle ear the same as the outside air pressure.
    1. Eustachian tube
    2. Ear drum
    3. Ear canal
12. When sounds reach the \_\_\_\_\_\_\_ or tympanic membrane, they make it vibrate.
    1. cochlea
    2. Eustachian tube
    3. Ear drum
    4. Ossicles
13. When Mr. Alpert/ Mr. Torrence swung a buzzer in a circle above their heads, this demonstrated the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ effect. Explain what happened as the buzzer moved in a circle.

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1. When Mr. Alpert/ Mr. Torrence spun the rope on a drill, the characteristic wave shape called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ wave was formed. This wave was characterized by points of no motion called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and points of maximum motion called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. When Mr. Alpert placed a vibrating tuning fork on your forehead, sound reached your brain through bone \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. When Mr. Alpert placed a vibrating tuning fork on the wooden cabinet, the sound got louder because of
   1. Forced vibration
   2. Resonance
   3. Bow waves
   4. Shock waves
4. When you rubbed your wet finger around a wine glass the pitch of the sound depended upon
   1. The total mass of the glass plus the water.
   2. The natural frequency of the glass alone
   3. The air vibrating above the glass
5. The Tacoma Narrows bridge in the State of Washington collapsed because the wind matched
   1. The natural frequency of the structure
   2. The weight of the cars on the bridge was too great
   3. Poor structural materials
6. Most of the students could hear sounds at 20,000 Hz. Mr. Alpert, however, could only hear sounds up to 12,000 Hz. This was due to damage to his
   1. Eustachian tube
   2. Auditory nerve
   3. Cochlea
   4. Semi-circular canals.
7. You have a virus of your middle ear, run a fever, and easily become dizzy. This is because the virus affects the
   1. Eustachian tube
   2. Auditory nerve
   3. Cochlea
   4. Semi-circular canals.
8. Explain why some people in the deaf community do not consider themselves,   
   “handicapped.” \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. In the original Star Wars movie, when the Death Star explodes, you hear a tremendous explosion. Why is this incorrect?

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1. Look at the row of tuning forks below They are all marked “C.” Circle the one which you think would produce the highest pitch.
2. Look at the pictures below, one represents a bow wave the other a shock wave. Explain the difference

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1. On the first day of our study of sound, we had a row of students waving sheets of paper up and down. What kind of wave was this and why does it represent a typical wave?

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1. Name three musical instruments and explain the following for each one:
   1. Primary source of the vibration
   2. That part of the instrument that reinforces the sound
   3. That part of the instrument that channels the sound to the listener or allows the sound to escape the instrument.

Instrument 1.

a.

b.

c.

Instrument 2

a.

b.

c.

Instrument 3

a.

b.

c.

1. You play two notes simultaneously at 440 Hz and 445 Hz. What beats do you hear?
2. The amplitude of a wave represents the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a sound.
3. What is the frequency of a wave that has a period of two seconds?
4. What is the period of a wave that has a frequency of 10 Hz?
5. What is the velocity of a wave that has a frequency of 100 Hz and a wave length of one meter?
6. You travel to Arizona on a hot day when the temperature is 40 degrees Celsius. What is the speed of sound on that day?
7. A train is travelling at 50 meters per second. Its horn produces a note at 110 Hz.

If you are standing at a station and the train is approaching you, what is the frequency of the note that you hear as the train approaches? Assume that the speed of sound on that day is 340 m/s.

1. Sound travels at 343 m/s. What is the wavelength of a note that is played at 440 Hz?

Remember to include units for full credit.

BONUS:

Mr. Alpert’s Wiki has an animated gif cartoon in the upper right hand corner. What is it?